IN THE CLAIMS:

Please amend the claims as follows:

1. (Withdrawn) A method of generating a mucosal cell that produces a protein in response to a nutrient, comprising:
   (a) contacting a mucosal cell with a polynucleotide comprising an expression control element in operable linkage with a nucleic acid encoding a protein under conditions allowing transformation of the cell; and
   (b) identifying a cell transformant that produces the protein in a nutrient-regulatable manner, thereby generating a mucosal cell that produces a protein in response to a nutrient.
2. (Withdrawn) An isolated or cultured mucosal cell that produces a protein regulatable by a nutrient, wherein expression of the protein is conferred by a transgene comprising an expression control element in operable linkage with a nucleic acid encoding the protein.
3. (Withdrawn) The mucosal cell of claim 2, wherein the nutrient increases expression or secretion of the protein.
4. (Withdrawn) The mucosal cell of claim 2, wherein the nutrient comprises a sugar, a fat, a carbohydrate or starch, an amino acid or polypeptide, a triglyceride, a vitamin, a mineral, or cellulose.
5. (Withdrawn) The mucosal cell of claim 2, wherein the expression control element comprises a nutrient-regulatable element.
6. (Withdrawn) The mucosal cell of claim 5, wherein the nutrient-regulatable element comprises a gut endocrine promoter.
7. (Withdrawn) The mucosal cell of claim 6, wherein the gut endocrine promoter comprises a glucose-dependent insulinotropic polypeptide (GIP) promoter.
8. (Withdrawn) The mucosal cell of claim 2, wherein the nucleic acid encodes insulin.
9. (Withdrawn) The mucosal cell of claim 2, wherein the nucleic acid encodes leptin, GLP-1, GLP-2, cholecystokinin, a glucagon antagonist, a growth hormone, a clotting factor, or an antibody.
10. (Withdrawn) The mucosal cell of claim 2, wherein the mucosal cell is obtained from a subject.

11. (Withdrawn) The mucosal cell of claim 11, wherein the subject is human.
12. (Withdrawn) The mucosal cell of claim 2, wherein the mucosal cell is obtained from a tissue or organ of the gastrointestinal tract or derived from a cell line of gut origin.
13. (Withdrawn) The mucosal cell of claim 12, wherein the tissue is the stomach.
14. (Withdrawn) The mucosal cell of claim 12, wherein the tissue is the duodenum.
15. (Withdrawn) The mucosal cell of claim 2, wherein the mucosal cell is an endocrine cell.
16. (Withdrawn) The mucosal cell of claim 15, wherein the endocrine cell is a K-cell.
17. (Withdrawn) The mucosal cell of claim 2, wherein the mucosal cell is a stem cell.
18. (Withdrawn) The mucosal cell of claim 2, wherein the mucosal cell is a non-endocrine cell.
19. (Withdrawn) The mucosal cell of claim 2, wherein the expression control element in operable linkage with a nucleic acid further comprises a vector.
20. (Withdrawn) The mucosal cell of claim 19, wherein the vector comprises a viral vector.
21. (Withdrawn) A method of treating a subject having, or at risk of having, a disorder treatable by producing a protein in a tissue, comprising implanting one or more mucosal cells of claim 2 into the tissue in an amount effective for treating the disorder.
22. (Withdrawn) The method of claim 21, wherein the disorder comprises a hyperglycemic condition.
23. (Withdrawn) The method of claim 22, wherein the hyperglycemic condition comprises diabetes.
24. (Withdrawn) The method of claim 21, where the subject has a fasting plasma glucose level greater than 110 mg/dl.
25. (Withdrawn) The method of claim 21, wherein the disorder comprises obesity or an undesirable body mass.
26. (Withdrawn) The method of claim 21, wherein the mucosal cell expresses insulin.
27. (Withdrawn) The method of claim 21, wherein the mucosal cell expresses leptin, GLP-1, GLP-2, cholecystokinin, a glucagon antagonist, a growth hormone, a clotting factor, or an antibody.
28. (Withdrawn) The method of claim 21, wherein the tissue is a mucosal tissue.
29. (Withdrawn) The method of claim 21, wherein the tissue is a non-mucosal tissue.

30. (Withdrawn) The method of claim 29, wherein the non-mucosal tissue is liver, pancreas or muscle.

31. (Previously Presented) A method of treating a subject having, or at risk of having, a disorder treatable by producing a therapeutic protein in a mucosal tissue, comprising contacting mucosal tissue cells in the subject transformed with a polynucleotide comprising an expression control element in operable linkage with a nucleic acid encoding the therapeutic protein with a nutrient that induces production of the protein in an amount effective to treat the disorder.

32. (Previously Presented) The method of claim 31, wherein the disorder comprises a hyperglycemic condition.

33. (Previously Presented) The method of claim 32, wherein the hyperglycemic condition comprises diabetes.

34. (Previously Presented) The method of claim 33, wherein the diabetes comprises type I diabetes.

35. (Previously Presented) The method of claim 31, wherein the subject has a fasting plasma glucose level greater than 110 mg/dl.

36. (Previously Presented) The method of claim 33, wherein the diabetes comprises insulin-dependent diabetes.

37. (Previously Presented) The method of claim 31, wherein the disorder comprises obesity or an undesirable body mass.

38. (Previously Presented) The method of claim 31, wherein the nutrient increases expression or secretion of the protein.

39. (Previously Presented) The method of claim 38, wherein expression of the protein is increased in non-endocrine cells.

40. (Previously Presented) The method of claim 38, wherein secretion of the protein is increased in endocrine cells.

41. (Previously Presented) The method of claim 31, wherein the nutrient comprises a sugar, a fat, a carbohydrate or starch, an amino acid or polypeptide, a triglyceride, a vitamin, a mineral, or cellulose.

42. (Previously Presented) The method of claim 31, wherein the expression control element comprises a nutrient-regulatable element.

43. (Previously Presented) The method of claim 42, wherein the nutrient-regulatable element comprises a gut endocrine promoter, a functional variant thereof, or a functional subsequence thereof.
44. (Previously Presented) The method of claim 43, wherein the gut endocrine promoter comprises a glucose-dependent insulinotropic polypeptide (GIP) promoter.
45. (Previously Presented) The method of claim 31, wherein the nucleic acid encodes insulin.
46. (Previously Presented) The method of claim 31, wherein the nucleic acid encodes leptin, GLP-1, GLP-2, cholecystokinin, a growth hormone, a clotting factor, or an antibody.
47. (Previously Presented) The method of claim 31, wherein the mucosal cell is present in a tissue or organ of the gastrointestinal tract of a subject.
48. (Previously Presented) The method of claim 47, wherein the tissue is the intestine.
49. (Previously Presented) The method of claim 47, wherein the tissue is the gut.
50. (Previously Presented) The method of claim 31, wherein the mucosal cell is an endocrine cell.
51. (Previously Presented) The method of claim 50, wherein the endocrine cell is a K-cell.
52. (Previously Presented) The method of claim 50, wherein the mucosal cell is a stem cell.
53. (Previously Presented) The method of claim 31, wherein the mucosal cell is a non-endocrine cell.
54. (Previously Presented) The method of claim 31, wherein the expression control element in operable linkage with a nucleic acid further comprises a vector.
55. (Previously Presented) The method of claim 54, wherein the vector comprises a viral vector.
56. (Withdrawn) A non-human transgenic animal that produces insulin in a mucosal tissue, insulin production not naturally occurring in the mucosal tissue of the animal, insulin production conferred by a transgene present in mucosal tissue cells, wherein the transgene comprises a polynucleotide including an expression control element in operable linkage with a nucleic acid encoding insulin, and wherein production of the insulin in the mucosal tissue of the animal is responsive to the nutrient.
57. (Withdrawn) The transgenic animal of claim 56, wherein the animal is a mouse.
58. (Withdrawn) The transgenic animal of claim 56, wherein the expression control element comprises a nutrient-regulatable element.

59. (Withdrawn) The transgenic animal of claim 56, wherein the nutrient-regulatable element comprises a glucose-inducible promoter, a functional variant thereof, or a functional subsequence thereof.

60. (Withdrawn) The transgenic animal of claim 59, wherein the glucose-inducible promoter comprises a glucose-dependent insulinotropic polypeptide (GIP) promoter.

61. (Withdrawn) The transgenic animal of claim 56, wherein the nucleic acid encoding insulin encodes a functional subsequence of insulin.

62. (Withdrawn) The transgenic animal of claim 56, wherein the mucosal tissue is a tissue or organ of the gut.

63. (Withdrawn) The transgenic animal of claim 61, wherein the mucosal tissue is the stomach.

64. (Withdrawn) The transgenic animal of claim 61, wherein the mucosal tissue is the duodenum.

65. (Withdrawn) The transgenic animal of claim 57, wherein the mucosal tissue includes endocrine cells.

66. (Withdrawn) The transgenic animal of claim 65, wherein the endocrine cell is a K cell.

67. (Withdrawn) The transgenic animal of claim 65, wherein the mucosal cell is a stem cell.

68. (Withdrawn) The transgenic animal of claim 56, wherein the animal is resistant to developing a hyperglycemic condition.

69. (Withdrawn) The transgenic animal of claim 68, wherein the hyperglycemic condition comprises diabetes.

70. (Withdrawn) An isolated cell of the transgenic animal of claim 56 that produces insulin in response to the nutrient.